NK/SK Br.

A	1555	Coondapur	D	1225
D	1609		A	1230
A	1650	Udipi	D	1140
D	1740		A	1130
A/D	1750	Karkal	A/D	1040
A/D	815	Mudbidri	A/D	1015
A/D	1905	Guruvayankere	A/D	0925
A	1930	Dharmasthal	D	0900

(iii) Gokarn to Shimoga via Kumta, Honnavar, Geresoppa, Jog falls, Kargal, Talguppa, and Sagar and their from Shimoga to Gokarn via Sagar, Talguppa, Kargal, Jog falls, Geresoppa, Honnavar and Kumta. One round trip daily and 2 vehicles to ply having S.C. of 45+10 to 50+10.

Distance of route : 237.5 Kms.

TIMINGS

D	1200	Gokarn	A	1430
A	1500	Kumta	D	1330
D	1515		A	1315
A	1400	Honnavar	D	1230
D	1415		A	1215
A/D	1515	Geresoppa	A/D	1115
A	1615	Jog Falls	D	1015
D	1645	(NK/SMG Br)	A	0945
A/D	1655	Kargal	A/D	0935
A/D	1725	Talguppa	A/D	0905
A	1750	Sagar	D	0840
D	1800		A	0830
A	2000	Shimoga	D	0630

(iv) (a) Kodibag to Mangalore via. Karwar: Ankola. Kumta, Bhatkal, Coondapur and Udipi and their from Mangalore to Kodibag via. Udipi, Coondapur, Bhatkal, Kumta, Ankola and Karwar.

Distance of Route : 303.3 Kms.

TIMINGS

D	1315	2215	Kodibag	A	0615 2115
A	1325	2225	Karwar	D	0605 2105
D	1330	2230		A	0600 2100
A	1410	2310	Ankola	D	0520 2020
D	1415	2315		A	0515 2015
A	1505	0005	Kumta	D	0425 1925
D	1515	0015		A	0415 1915
A	1635	0135	Bhatkal	D	0255 1755
D	1705	0205		A	0225 1725

SK/NK Br.

A	1835	0335	Coondapur	D	0035 1535
D	1845	0345		A	0045 1545
A	1930	0430	Udipi	D	2400 1500
D	1940	0440		A	2350 1450
A	2100	0600	Mangalore	D	2230 1330

(iv) (a) Two round trips daily. to ply 4 vehicles having S. C. of 43+10 to 50+10.

(iv) (b) Dandeli to Bangalore via Ambikanagar, Yellapur, Sirsi, Siddapur, Sagar, Shimoga, Tarikere, Arisikere, Tumkur, and Back from Bangalore to Dandeli vla. Tomkur, Arisikere, Tarikere, Shimoga, Sagar, Siddapur, Sirsi, Yallapur, and Ambikanagar. One round trip daily to ply 2 vehicles having S C of 43+10 to 50+10.

Distance of Route : 558.0 Kms.

TIMINGS

D	1700	Dandeli	A 0800
A	1725	Ambikanagar	D 0730
D	1730		A 0735
A	825	Yellapur	D 0635
D	1830		A 0630
A	1945	Sirsi	D 0815
D	2015		A 0445
A	2100	Siddapur	D 0400
D	2105		A 0355

NK/SMG Br.

A	2150	Sagar	D 0310
D	2155		A 0305
A	2315	Shimoga	D 0145
D	2345		A 0115

SMG/CKM Br

A	0030	Tarikere	D 0030
D	0035		A 0025
A	0200	Arisikere	D 2300
D	0205		A 2255

HSN/TMK Br.

A	0400	Tumkur	D 2100
D	0430		A 2030

TMK/BNG Br.

A	0600	Bangalore	D 1900

Those who have any representations to make in this connection with reference to section 47 of the M.V. Act, 1939 may do so in writing affixin court fee stamp of value of Rs. 1-00 so as to reach the undersigned in this office with in 15 days from the date of publication of this Notification in Karnataka Gazette and furnish copies there of simultaneously to the applicant.

The representations so received from the other persons and after the prescribed date of the copies of which have not been furnished simultaneously to the applicant will not be considered.

The applications and their representations received as above will be considered by the Regional Transport Authority, Karwar at its meeting. The applicant and the persons who have made the representations as above will be heard by the R.T.A. Karwar either in person or through their authorised representative at the time of consideration of the application. Notice of the Meeting will be sent seperately.

451 *Secretary, R.T.A.*

BANGALORE UNIVERSITY

JNANABHARATHI

Dated 9th February 1976

Bangalore—560056

Notification No. ACA II G2 Regl. Syll. M-Pharm/75/76

Ref:—No. ED 78 UBV 75 dated 19th January, 1976 from the Under Secretary to Government, Education and Youth Services Department, Vidhana Soudha, Bangalore-560001.

The Chancellor is pleased to approve of the Regulations, Syllabus etc., for the M-Pharm Degree Course, subject to the condition that the reservation of seats for the course will be regulated as per Section 6 of the Karnataka State Universities Ordinance 1975.

The regulations, syllabus etc., for the M-Pharma Degree Course is appended herewith.

BY ORDER

.....
Registrar.

Regulations for the Two Years Course leading to

THE MASTER'S DEGREE IN PHARMACY

1. *Eligibility*:—No candidate who has not passed the B. Pharm Degree Examination (qualifiing examination) of Bangalore University or an examination equivalent thereto of any other recognised University or Institution and who has scored not less than 55 per cent of the Maximum Marks prescribed for the qualifying examination shall be eligible for admission to the M. Pharma Course.

2. *Application*:—Applications for admission shall be made to the proper authority in prescribed forms through the Head of the Institution where the candidate wishes to pursue his/her studies.

3. *Duration*:—The course of study including the the dissertation shall extend over a period of two academic years, in a constituent or affiliated college where the candidate has sought admission. Provided, however, that members of the teaching staff employed in the concerned constituent college who wish to improve their academic qualification can register themselves for the M-Pharma course as part time students and shall be permitted to complete M.Pharm Part-I course, in parts, in not less than two years In respect of M.Pharm Part-II examination, the same rules as applicable to full-time students shall also apply to such part-time students.

4. *Examinations*:—There shall be two annual Examinations, one at the end of the first academic year called M.Pharm Part-I Examination and the other at the end of the second academic year, called the M.Pharm Part-II Examination. The Degree awarded shall be M.Pharm in any one of the following branches depending upon the choice of subjects.

Pharmaceutics
Medicinal Chemistry
Pharmacognosy
Pharmacology.

5. *Courses of Study*:—M.Pharm Part-I Courses o Study shall consist of four of courses listed below. Course No. 1 shall be compulsory for all students. A candidate shall specialise in any of the four Branches, all courses from that Branch being compulsory.

Course No.	*Title*	*Theory Hours/Week*	*Practicals Hours/Week*
1.	Modern Pharmaceutical Analysis ..	3	6
	Branch A:—*Pharmaceutics.*		
2.	Principles of Product Development ..	2	4
3.	Bio-Pharmacy ..	2	4
4.	Pharmaceutical Dosage Forms ..	2	4
	Branch B:—*Medicinal Chemistry*		
5.	Advanced Organic Chemistry ..	2	4
6.	Structure-Activity Relationship ..	2	4
7.	Chemistry of Natural Products and Biogenesis ..	2	4
	Branch C:—*Pharmacognosy.*		
8.	Chemistry of Natural Products and Biogenesis ..	2	4
9.	Advanced Pharmacognosy I ..	2	4
10.	Advanced Pharmacognosy II ..	2	4
	Branch D:—*Pharmacology.*		
11.	Pharmacology I ..	2	4
12.	Pharmacology II ..	2	4
13.	Structure-Activity Relationship ..	2	4

6. *Attendance*:—No candidate who has not attended a minimum of 80 per cent of the total theory and practical classes separately in each prescribed subject shall be permitted to appear for the M. Pharma Part I Examination.

Board of Examiners:—There shall be 4 Examiners out of which 2 shall be from outside the State.

7. *Scheme of M. Pharma Part I Examination*:—There shall be four theory papers, one in each of the registered courses, each of 3 hours duration and carrying 100 marks. There shall be only two practical examinations.

	Subject	*Duration*	*Marks*
1.	Modern Pharmaceutical .. Analysis	6 hours	75
2.	Comprehensive Practical Examination including viva-voce, covering the syllabi in the remaining three practical courses registe red. ..	18 hours	225

(*a*) Sessional marks in theory shall be awarded on the basis of the average of 2 Sessional Examinations and and one Seminar to be held at regular intervals. Sessional marks for each theory course shall be 50.

(*b*) Sessional marks for practicals shall be awarded on the basis of the average of marks awarded individually to each experiment taking into account the candidate's (i) preparedness (ii) manner of laboratory work (iii) accuracy/quality of results (iv) regularity in completion and submission of laboratory record and (v) discipline in the laboratory. Sessional marks for each Practical course shall be 75.

8. No candidate who has not obtained a minimum of 50 per cent of the maximum marks prescribed for each theory and practical subject separately in sessional and annual examination taken together shall be declared to have passed the M.Pharm Part-I Examination.

9. No. candidate who has not passed the M.Pharma Part-I examination in all the subjects shall be eligible for admission to M. Pharma Part II course.

10. M.PharmaPart II Course shall consist of a Dissertation written on the regular research work during the second year by the candidate on a research project selected by the candidate and approved by his Supervisor either in the Institute where he/she has been admitted or in any other Institution under an approved Supervisor.

11. Five copies of the Dissertation duly certified by the Supervisor shall be submitted to the University by the candidate either in printed or type-written form through the Head of the Institution, before the date prescribed by the University. The oral Examination shall be held within two months after the acceptance of the dissertation. Should any candidate fail to submit the dissertation on or before the prescribed date, his/her oral examination shall be conducted on the date to be prescribed by the University, which shall not be earlier than six months from the date prescribed in the first instance.

12. The dissertation shall be valued jointy by (i) two external examiners to be appointed by the University; and (ii) two internal examinars. The Dissertation shall have to be approved by all the four Examiners. Should it be rejected by either examiner, the University shall

refer the dissertation along with the reports of the previous examiners, without mentioning the names to another external examiner to be appointed by the University whose decision shall be final. If the dissertation is rejected even by the fifth examiner, he shall intimate the candidate accordingly through the University giving valid reasons for such rejection and suggestions regarding the methods of rectifying the defects in the dissertation. The candidate may be given 4 months from the date of such communication to resubmit the dissertation in the revised form as suggested by the Examiner. After the approval of the dissertation by the Examiners, a viva-voce examination of the candidate shall be held by four examiners jointly."

13. Minimum for acceptance of dissertation and passing the viva-voce shall be 50 per cent of the prescribed marks. For the purposes of determining the class of the candidate, marks shall be awarded to both the accepted dissertation and viva-voce examination together out of a maximum of 200 (each examiner shall separately award marks for dissertation and viva-voce examination out of a maximum of 50 These marks shall then be added).

14. Class shall be declared on the basis of the aggregate of the marks in M-Pharm Part I and Part II examinations. :—

60% or more	..	First Class
Less than 60%	..	Second Class

COURSE No. 1.

MODERN PHARMACEUTICAL ANALYSIS

Principles, techniques and applications of the following;

1. Optional Rotatory Dispersion,
2. Spectrophotometry (U. V. & I. R.)
3. X-Ray Defraction Analysis,
4. N. M. R. and E. S. R.
5. Mass Spectrometry,
6. Polarography,
7. T. L. C. and G. L. C.
8. Electrophoresis.
9. Counter current Distribution,
10. Tracer Techniques,
11. Ultracentrifugal Analysis,
12. Biological methods of Analysis,
13. Microbiological methods of Analysis,
14. Pharmacognostical methods of Analysis.
15. Statistical methods of analysis,
16. Research methodology including literature survey.

PRACTICALS

Representative exercises based on theory topics.

BRANCH A

Pharmaceutics

COURSE No. 2.

PRINCIPLES OF PRODUCT DEVELOPMENT

Theory

1. *Physics of tablet making* :—Compressional behaviour of medicaments, tablet excepients, energy expenditure during compression, porosity and compactness of granules, selection of binders, disintegrants, lubricants, glidents etc., Angle of repose and its significance.

2. *Surface activity* :—Types of interfaces, surface and interfacial tensions, structure and properties of surfactants, classification of surfactants. Use of surfactants in pharmaceutical systems.

3. *Rheology* :—Newtonion flow, plastic flow, pseudoplastic flow, dilatant flow, methods of measuring viscosity, polymer solutions, thixotropy, and pharmaceutical applications thereof. Suspensions. Dispersed systems, particle size, electrical charges on the dispersed particles. Suspension technology, flocculation, stabilization, evaluation of suspending agents. Emulsions. Theory of emulsions, emulsification, emulsion stability, mechanics of emulsification— special problems. Evaluation of emul gents.

4. *Reaction Kinetics* :—First, Second, Third and and Zero order reactions, simultaneous, consecutive and oppositing reactions. Molecularity of reactions, effect of temperature on reaction rates, activation, activation energy and the activated complex, influence of enaymes, pH and catalysts.

Application of reaction kinetics to the evaluation of stability of drugs in the pharmaceutical systems. Date of expiry of drugs.

5. *Radio Pharmacy* :—Radiation, radio isotopes, radioopaques, and other dyes and chemicals used for diagnostic and thereorapeutic purposes.

6. *Micromeritics* :—Particle size and size distribution measurements, perosility densities of particles— Bulk and and Bulk control. Flow properties and cohesiveness of powders and granules and their application to powder filling and tabletting.

7. Computers in Pharmacy and data processing methods.

REFERENCE BOOKS

1.	Experimental Pharmaceutical Technology—3rd Edn.	Parrott and Sarki
2.	Pharmaceutical Technology Fundamental Pharmaceutics.	Parrot
3.	Remington's practice of Pharmacy	Remington
4.	Pharmaceutical Dispensing ..	Husa
5.	Physical Pharmacy ..	Martin
6.	Dispensing for Pharmaceutical Students.	Cooper and Gunn
7.	Tutorial Pharmacy ..	Cooper
8.	Bentley's Text Book of Pharmaceutics.	Davis
9.	Advancesin Pharmaceutical Sciences Vol. 1, 2, 3.	Binn and Bickett
10.	Radio Active Pharmaceuticals ..	Andrews
11.	Theory and Practice of Industrial Pharmacy.	Lachman etal
12.	General Principles of Drug Action	Gaitonde and Kulkarni.
13.	Physical and Technical Pharmacy	Burlage
14.	Indian Pharmacopoeia ..	Govt. of India

COURSE No. 3.

BIO-PHARMACY

Applied Microbiology

1. Effect of physical and chemical agents on Microorganisms, sterilization, theory and application of ionizing radiations to sterilization of foods and pharmaceuticals, methods of sterilisation using gases high energy radiation, methods of testing, sterility. Testing for pyrogens.

2. Aseptic condition, white room, Air conditioning HEPA filters. Ultra Structure of microbial cells, general morphology of bacteria, moulds, yeasts, viruses, rickettsia etc., Laboratory culturing of various pathogenic organisms, replication of viruses, lysogency, egg culture, bacterial toxins and pyrogens.

3. Bactericidal, Bacteriostatic and antimicrobial agents in preservation of pharmaceutical systems. Strain variation and genetics, bacterial disceciation, variation in cell structure aberrant forms, environmental influence.

4. Immunity: types of immunity, antigens and antibodies, hypersensitivity. Immunizational agents—bacterial vaccines, toxoids, vird vaccines, ricketsrial vaccines, antitoxious sera and entivenoms. Blood derivatives (human) plasma substitutes.....

Biopharmaceutics

5. Penetation of drugs through Biological membrance distribution storage and elimination. Factors influencing routes of drug administration, pharmacokinetics, exponential drug disapporance. Biologic half life, use and application of tissue concentration data in design of dosage forms with respect to release, absorption and excretion.

Reference Books

1.	Biochemical Engineering ..	Webb
2.	Elements of Food Engineering ..	Parker, Hanvey and Stettler
3.	Disinfection and Sterilization ..	Sykes
4.	Industrial Detergency ..	Niven
5.	Dispensing of Medication ..	Martin
6.	Advance in Pharmaceutical Sciences Vol. II, III.	Bean etal
7.	Biopharmaceutics and Relevant Pharmacekinetics 1st Edn.	Wanger
8.	Remington's Pharmaceutical Sciences.	
9.	Bentley's Text Book of Pharmacetics.	Davis
10.	Tutorial Pharmacy ..	Cooper
11.	Clinical Pharmacy ..	Jenkins etal
12.	Reviews in Microbiology	
13.	Hand Book of Bacteriological Teachniques.	F.J. Baker
14.	Review Sterilization and Disinfection.	Ruboand Cardner.
15.	Fundamental Principles of Bacteriology	Salle
16.	Medical Microbiology	Cruekshank
17.	The Biochemistry of Viruses	Ed. by Hilton B. Levy
18.	Indian Pharmacopeoial	Govt. of India
19.	Analytical Microbiology	by Frederick and Kavanagh
20.	Industrial Microbiology	Prescot and Dunn
21.	Immunology and or Serology	Carpenter
22.	Principles of Bacteriology and Immunity	Topley and Willson
23.	Principles of Immunology	Crushing and Campbell
24.	Advances in Immunology	Taliaferro and Humpharey Vol. I to II
25.	Methods in Immunology and Immuno Chemistry	Williams and Chese Vol 1-2

COURSE No. 4

PHARMACEUTICAL DOSAGE FORMS

1. *Pharmaceutical formulation:* Physical, Physiological and chemical problems in the formulation of dosage forms of medicaments. Significance of drug safety.

2. *Incompatibilities:* General problems of incompatibilities and instabilities in multicmponent formulations Specific organic incompatibilities, with special reference to multivitamin formulations.

3. Production of Liquid preparations meant for botinternal administration and external application. Seleh ction of solvent systems, formulation aids, methods of compounding, clarification, filling and packing, study, of special preparations containing, analgesics, antibiotics antiplasmodics, antitussives, antiallergics, expectorants, multivitamins, psychopharmacological agents, hormones etc.,

4. *Produotion of parenteral Preparations*:—Parenteral administration, selection of components, production requirements and procedures, packing and labelling. Development, production and evaluation of depot forms and implants therapy.

5. *Fabrication of tablets*:—Sugar coating, polishing, film coating, fluidized bed coating, compression coating.

Special coating procedures *e.g.* enteric coating. Development, fabrication and evaluation of sustained release products.

Capsules:—Hard and soft gelatin capsules, encapsulation of Powders, semisolids and liquids.

6. *Dermatological Products*:—Formulation, production and evaluation.

7. *Formulation of cosmetic preparations*:—Various creams for the skin, hair creams, talcums, deodorants, tooth pastes and powders, shampoos and detergents.

8. *Aerosols*:—Aerosol therapy, liquified gas propellant system, mechanism of aerosol operations, compressed gases, containers and methods of aerosol filling, Pharmaceutical application.

9. *Evaluation of dosage forms*:—Good manufacturing practice, quality control.

10. Selection and evaluation of Pharmaceutical pakaging materials, containers and closures, special problems of container-product interaction, Pharmaceutical specifications and tests of standards.

REFERENCE BOOKS

1.	Hand Book of Cosmetic materials	Greenberg, Lester Haggard.
2.	Skin Theraupetics ..	Palano
3.	Tutorial Pharmacy ..	Cooper
4.	Bentley's Text Book of Pharmaceutics ..	Davis
5.	Remington's Practice of Pharmacy	Remington
6.	Tablet Coating ..	Clarkson
7.	Tablet making ..	Mitchel
8.	Science and Practice of Pharmacy.	Bennett and Cooking.
9.	Principles of Pharmacy ..	Arny
10.	Theatise on Pharmacy ..	Caspari & Kelly
11.	Art of Compounding ..	Scoville
12.	Pharmaceutical Emulsions and Emulsifying Agents ..	Spalton
13.	Cosmetic Materials ..	Denavarre
14.	Orientation to Pharmacy ..	Burlage
15.	Dispensing for Pharmaceutical Students ..	Cooper and Gunn
16.	Hand Book of Cosmetic Sciences	Hibbott
17.	Introduction to Pharmaceutical Formulations ..	Fishburn
18.	Indian Pharmaceutical Industry..	..
19.	Art of Compounding ..	Jenkins etal
20.	Physical and Technical Pharamacy	Burlage
21.	Clinical Pharmacy ..	Jenkins etal
22.	Perfumes Cosmetics and Soaps ..	Poucher
23.	Aerosols ..	Shephard and Sagarin.
24.	Indian Pharmacopoeia ..	..
25.	British Pharmaceutical Codex ..	..
26.	Extra Pharmacopoeia ..	..

BRANCH—A

PRACTICAL WORK FOR PHARMACEUTICS

(Courses Nos. 2, 3, and 4)

1. Fabrication, evaluation and accelerated stability study of complete range of dosage forms to illustrate the principles and processes covered under theory.

2. Biopharmaceutical studies of atleast six pure drugs and their corresponding dosage forms illucidating the influence of formulation additives on bio-availability.,,

Journals

1. Manufacturing Chemist.
2. Journal of Indian Pharmaceutical Manufacturers.
3. American Journal of Pharmacy.
4. Journal of Pharmacy and Pharmacology.
5. Journal of Pharmaceutical Sciences.
6. Industrial Times.
7. International Pharmaceutical Abstract.
8. Science Digest.
9. Scientific America.
10. Pharma International.
11. Drug Intelligence.
12. Journal of Biopharmaceutics and Pharmaco-kine tics.
13. Indian Journal of Pharmacy.
14. Pharmaceutical Industry.
15. American Journal of Hospital Pharmacy.
16. Pharmaceutical Journal
17. American Journal of Pharmaceutical Education
18. Lancet.
19. Journal of Drug and Cosmetic Industry.
20. Australian Journal of Pharmacy.
21. Indian Chemical Journal.

BRANCH—B

MEDICINAL CHEMISTRY

COURSE No. 5

ADVANCED ORGANIC CHEMISTRY

Structure of Organic molecules:—Localised chemica bonding. Delocalised Chemical bonding, Bonding weaker than covalent.

2. *Stereo Chemistry*:—Optical isomerism and opti cal activity. Geometrical isomerism, conformational analysis, strain, Stereo-selective synthesis.

3. Reactions and Mechanism involving carboniumions, carbanions, Free radicals and carbenes, Acids and bases.

4. Study of the mechanism and reactivity of the following reactions with suitable examples:

Aliphatic Nucleophilic Substitution,
Aromatic electrophilic substitution,
Aliphatic electrophilic substitution,
Aromatic Nucleophilic substitution,
Free radical substitution,
Addition to carbon carbon multiple bonds,
Addition to carbon hetero multiple bonds.
Elimination reactions, rearrangement reactioes.

5. Oxidation and reduction reactions: Study of the individual reactions: Birch reduction Clemmenson's reduction; Grignard reduction Meerwin pondorff reduction, Oppenauer oxidation; Wittig reaction, Wolf Kischner reduction, Hydrogenation, ozonolysis.

Practical Work

1. Preparation of Organic compounds involving two to three stages or more representing some important organic reactions.

2. Qualitative detection of mixtures of 2 or 3 organic compounds by separation, and systematic, identification Quantitative estimation of Elements and Functional groups in Organic compounds.

Books

1.	Advanced Organic Chemistry	Jerry March
2.	Organic Chemistry ..	Morrison and Boyd
3.	Organic Chemistry Advanced treatise. ..	Gilmann.
4.	Principles of Organic Chemistry	Geissmann
5.	Modern structural theory of Organic Chemistry ..	Ferguson
6.	Organic Chemistry ..	Feiser and Feiser
7.	Journal of Organic Chemistry.	..
8.	Indian Journal of Chemistry ..	..

STRUCTURE-ACTIVITY RELATIONSHIP

COURSE No.

1. *Physiochemical properties and biological action of of drug molecules*:—Isosterism and Bioisosterism as guides to structural variation.

2. *Biological role of the macromolecules*:—Proteins, nucleic acids, Polysaccharides, immcopeptides enzymes, Viruses, Supramolecules.

3. Actions on Peripherical nerve fibres, classification of synapses, Action at Cholinergi, adrenergic histaminonic receptrors, neuromuscular junction, direct action on tissues.

A general treatment of the approaches to drug design including the method of variation, study of the use o Bio-chemical and physiological information involving new drugs.

4. *Structure and activity relationship studies*:—General aspects of structure and activity relationship. Effect. of specific chemical grouping, on the activity of drugss Structure and activity relationship of important categorie of drugs mentioned below under (5).

5. Detailed treatment of the following class of medicinal agents; preparation, methods of testing of drugs in I.P./B.P./U.S.P./E.X.P and New and non-official drugs.

Psychoparmacological agents, analeptics, cholinergics, curare and curariform drugs. Drugs used for hyperkinetic disorders and muscle relaxatants, ganglion blocking agents, Hypotensive agents, Adrenergic drugs. Oxytocics cardic drugs Atherosolerotics and anticoagulants, Ana boloc agents, Tracers in medicinal studies, drugs for irra diation sickness.

6. *Chemotherapeutic agents*:—Introduction to Chemotherapy study of various chemotherapeutic agents official in IP/BP/USP/EXP Pharmacopoeia and new non-official drugs.

Practical Work.

1. Preparation and study of the manufacturing process of certain selected drugs.

2. Analysis of some selected drugs by chemical methods.

Books

Burger ..	Medicinal Chemistry Vol. I and II.
Wilson and Gisvold ..	Chemistry of Organic Medicinal Products.
Sextent ..	Chemical structure and Biological activity.
Drill's Pharmacology, in medicine.	Edited by Joseph R. Depalma.
Barlow	Chemical Pharmacology.
Lewis	Pharmacology (Revised by James Crosslaw).
Mays	Chemistry of synthetic drugs.
Feiser and Feiser	Topics in Organic Chemistry.
Pharmacological Basis of therapeutics.	Goodman and Gillan.
Timas hoff	Structure and stability of Biological Macraed Journal of medicinal Chemistry.
Journal of Chromatography	Journal of Biological Chemistry Pharmacological reviews.

BRANCH C

COURSE No. 7

Pharmacognosy

CHEMISTRY OF NATURAL PRODUCTS AND BIOGENESIS

1. Techniques employed in the elucidation of Biogenitic pathways in plants and animals.

2. A detailed study of the following classes of natural products.

Alkaloids.—Methods of degradation, Determination of structure, and synthesis of the following—Atropine, Papaverine, Quinine, Reserpine and Ergometrine. Biogenesis of important alkaloids.

3. *Steroids.*—A general study of the Chemistry including Biogenesis of steroid molecule with special reference to the following—Cholosterol, Cholic acid, vitamin D2, Cortisones, Diosgenin asasteroids. Biogenesis of steroid derivatives and Hormones.

Synthesis and importance of steroid harmones and their synthetic deratives official in IP/BP and USP.

4. *Polypeptides and proteins.*—General study of the purification General methods of degradation, separation, amino acid determination, and group analysis. Synthesis of aminoacids and polypeptides, constitution of vasopressin and oxytocin.

5. *Vitamins.*—A general study of the chemistry of all important vitamins, with detailed treatment of Vitamin A, Thiamine, Riboflavine, ascorbic acid and Folic acid.

6. *Porphyrine.*—A general study with reference to chlorophyl and Haemin.

7. A general study of the natural colours and occurrence of plant pigments, Anthocyanin, Pthalocyanin, Flavones, etc., and their uses.

8. Biosynthesis of important glycosides.

9. Biosynthesis of teppenoids.

10. Aromatic biosynthesis.

Practicals

1. Isolation of natural products and Purification.

2. Study of the systematic chemical methods for the determination of structure of certain typical plant products.

3. Study of the Chemical methods for the analysis of some of the natural products.

BOOKS

1.	Organic constituents of higher plants	Robinson
2.	Alkaloids ..	Manski
3.	Advanced Organic Chemistry ..	Gillman
4.	Steroids ..	Faiser and Feiser
5.	Modern methods of Plant analysis	K. Pacet and M. V. Tracey
6.	Journal of Biological Chemistry ..	
7.	Indian Journal of Pharmacy	
8.	Journal of Pharmacy and Pharmacology	
9.	Loydia	

COURSE No.8

ADVANCED PHARMACOGNOSY-I

THEORY

(a) Quantitative microscopic techniques employed is the evaluation of crude drugs, spices and other plant materials of economic interest.

(b) Microtomy and photomicrography

(c) Chemotaxonomy

(d) Tissue Culture Techniques

(e Systematic methods of cultivation of promising indigenous medicinal and economically important plants, selection, by bridization, polyploidy, mutation and growth hormones.

Practicals

Exercises illustrative of the theoretical aspect of the syllabus including preparation of Herbarium sheets.

Books and References

1.	Quantitative Microscopy	T. E. Wallis
2.	Analytical Microscopy	T. E. Wallis
3.	Chemotaxenomy	Hagnaus
4.	Journals mentioned under Course	No. 9

COURSE No.9.

ADVANCED PHARMACOGNOSY-II

THEORY

(a) One seminar per week to be given by students (by rotation) on important recent. Pharmacognostic publications appeared in Scientific Journals like, Biochemica Biophysica Act, Lloydia, planta Medica, phytochmistry, J. Chromatography, Indian Journal of pharmacy, Economic Botany etc.,

(b) Methods of systematic phytochemical investigation of the drugs including isolation, purification and characterization.

(c) Methods of isolation of the following substances, Sennosides, Strychnine, Brucine, Berbirine, Cardiac Glycosides, Quinine, Quinidine, diosgenine, Atropine, Scopolamine, Ephedrine, Emetine, tannin, Rurin and such other compounds.

Practicals

Exercises based on theoretical aspect of the syllabus

References

1. Biochemica Biophysica Acta
2. Planta Medica
3. Journal of phytochemistry
4. Journal of Chromatography
5. Lloydia
6. Indian Journal of pharmacy
7. Economic Botany

BRANCH D

COURSE No. 10.

PHARMACOLOGY I

THEORY

I. Modern trends in Pharmacology. The natural law governing the use of drugs in man and animals. An intimate study of drug action ; absorption, distribution and fate of drugs in the body, mechanism of drug actions.

II. Specialised study of the Pharmacological action of the following categories of drugs.

1. Anaesthetics including aneasthesea.
2. Drugs acting on central nervous system.
3. Drugs acting on autonomic nervous system.
4. Drugs acting on animal behaviour.
5. Drugs acting on the peripheral nervous system & neuromuscular (skeletal) system.
6. Drugs acting on cardiovascula system including haemopoetics.
7. Drugs acting on the water and salt balance.
8. Drugs acting on gastro-intestinal system
9. Histamine & antihisamines serotenin
10. Hormones, prostaglandins
11. Drugs acting on reproductive system.
12. Diagnostic agents and plasma expanders
13. Chemotherapeutic agents.

Practicals

Experiments to illustrate the theoretical aspects given above.

Books

1. Lewis's Pharmacology (Revised by James Cross Law)
2. Drill's Pharmacology in Medicine Edited by Joseph R. Dipalma.
3. Pharmacology, Materia Medica and therapeuties (R. Ghosh).
4. Pharmacological Basis of Therapeutics—Goodman and Gillman.
5. Pharmacological reviews.
6. Journal of Pharmacy and Pharmacology
7. Journal of Medicinal Chemistry.

COURSE No. 11

PHARMACOLOGY II

THEORY

I. Principles of the methods for testing the Pharmacological actions of different kinds of drugs acting on Central and Autonomtic nervous system, smooth and skeletal muscles. Candievascular system rino-ugenital system. respiratory system, Enzymes and Psychic centres.

II. Methods for toxicity tests, acute subacute and chronic toxicity, Histochemical techniques (including the toxicitystudy of different organs like, liver, kidney, lungs, spleen) Methods for locating the site of drug action.

III. Experimental methods employed in Pharmacology with special reference to the development of successful drugs, principles of testing of drug in human beings. Designs of cunical trials, clinical techniques, enzymatic techniques in the evaluation of certain important type of drugs.

IV. Maintainance, care and breeding of the Laboratory animals. Preparation of the animals for drug screening.

V. Biometrics, comprising of Bioassay and Drug standardisation of important drugs with special reference to the drugs mentioned in I.P. B.P. and U.S.P.

Practicals

Experiments to illustrate the theorytical aspect given above.

Books

1. Biological standardisation by J. H. Burn
2. Experimental Pharmacology Kimpton
3. Methods on medicinal Research (Yearly publication Chickago).
4. Fundamental experiences in Pharmacology—Sollman and Harizlin.
5. British Pharmacopoeia
6. Indian Pharmacopoeia
7. Care and Breeding of the Lab. animals. . by Feris I
8. Experiments Pharmacology- perry Vol I and r I
9. United States Pharmacopoeia

OFFICE OF THE DIRECTOR OF ARCHAEOLOGY AND MUSEUMS, BANGALORE.

Subject :—Registration Antiquities-Antiquities and Art Treasures Act, 1972 and Rules 1973.

Consequent to the enforcement of the provisions of the Antiquities and Art Treasures Act, 1972 (and Rules 1973), every person who owns, controls or is in possession of any antiquity shall have to register such an antiquity before the respective Registrering Officer, under Section (3) (14) of the Act, before 2nd October 1976. The said Act has come into force from 5th April 1976.

Any person who desires to carry on business of selling them, he or she is required to obtain a licence from the Licencing Officer, under section 7(1) of the Act, before expiry of the period of six months from 5th April 1976, positively.

The antiquity includes the following three items, which have been in existence for not less than 100 years.

(i) Sculptures in stone, terracotta, metals, ivory and bone:
(ii) Paintings (including miniatures and tankas) in all media; and
(iii) Manuscripts containing paintings, illustrations or illuminations (adornment with coloured lettering or illustrations)

Application for licence has to be made in Form I and shall be accompanied with a Challan of Rs. 100/- in token of having paid the fee for the licence applied for. The amount has to be remitted to the head "078 Art and Culture, Archaeological Survey, Other Receipts."